AMENDMENTS TO THE CLAIMS

Claims 1-33 are pending in the instant application. Claims 1-28 have been cancelled. Claims 29-33 have been allowed. New claims 34-44 have been added. The Applicants request reconsideration of the claims in view of the following amendments and remarks.

Listing of claims:

1. – 28.   (Cancelled)

29. (previously presented) An array processing module comprising:

M signal processing chains wherein each of the M signal processing chains is configured to receive a replica of a received signal from a corresponding one of M physical antenna elements; and

an interpolation module coupled to the M signal processing chains, wherein the interpolation module is configured to generate N signal response values for the antenna array as a function of the M replicas of the received signal, wherein N is greater than M.

30. (Original)   The array processing module of claim 29 including:

a weighting module coupled to the M signal processing chains wherein the weighting module is configured to calculate M physical weighting parameters as a

function of the M replicas of the received signal, wherein each of the M physical weighting parameters is associated with a corresponding one of the M physical antenna elements;

wherein the interpolation module is configured to generate the N signal response values for the antenna array as a function of the M physical weighting parameters.

31. (Original)   The array processing module of claim 29 including:

a weighting module coupled to the M signal processing chains wherein the weighting module is configured to calculate N weighting parameters as a function of the N signal response values; and

N weighting elements configured to receive the N signal response values, wherein each of the N weighting elements weights each of a corresponding one of the N signal response values by a corresponding one of the N weighting parameters, thereby generating N weighted signal response values.

32. (Original)   The array processing module of claim 31 including:

a summing portion configured to receive the N weighted signal response values from the N weighting elements and provide a combined signal representative of the received signal.

33. (Original)   The array processing module of claim 29 including:

a down conversion portion coupled to each of the M signal processing chains, wherein the down conversion portion is configured to convert the M replicas of the received signal from radio frequency (RF) to baseband frequency.

34. (New)   A method for processing a signal received by an antenna array comprising:

receiving M replicas of the signal, each of the M replicas being received by one of a corresponding M physical antenna elements of the antenna array;

determining M responses of the M physical antenna elements to the signal, each of the M responses corresponding to one of the M physical antenna elements;

and

generating, as a function of the responses of the M physical antenna elements to the signal, N responses to the signal, respectively associated with N spatial locations along the antenna array, wherein at least one of the N spatial locations is not coincident with a location of any of the M physical antenna elements and is placed at a non-equidistant location between two successive physical antenna elements, and wherein (N − M) responses of the N responses

are associated with virtual antenna elements located among the physical antenna

elements.

35. (New)   The method of claim 1, wherein at least one of the (N – M)

responses is generated by interpolating at least two of the M responses.

36. (New)   The method of claim 1, wherein at least one of the (N – M)

responses is generated by extrapolating from at least two of the M responses.

37. (New)   An antenna system for receiving a signal comprising:

an antenna array including M physical antenna elements, wherein the M

physical antenna elements are spatially arranged to receive one of a

corresponding M replicas of the signal so as to be capable of generating M

replicas of the received signal; and

an array processing module including M signal processing chains, wherein

each of the M signal processing chains is coupled to one of the M physical

antenna elements;

wherein the array processing module is configured to generate N signal

response values for the antenna array as a function of the M replicas of the

received signal; wherein the N signal response values include at least one virtual antenna response value, wherein N is greater than M, and

wherein the array processing module comprises:

a weighting module coupled to the M signal processing chains wherein the weighting module is configured to calculate M physical weighting parameters as a function of the M replicas of the received signal, wherein each of the M physical weighting parameters is associated with a corresponding one of the M physical antenna elements; and

an interpolation module coupled to the M signal processing chains, wherein the interpolation module is configured to generate the N signal response values for the antenna array as a function of the M physical weighting parameters.

38. (New)   The antenna system of claim 11, wherein the interpolation module is configured to calculate the M signal response values as a function of the M physical weighting parameters and interpolate at least two of the M signal response values to provide the virtual antenna response value.

39. (New)   An antenna system for receiving a signal comprising:

an antenna array including M physical antenna elements, wherein the M physical antenna elements are spatially arranged to receive one of a

corresponding M replicas of the signal so as to be capable of generating M replicas of the received signal; and

an array processing module including M signal processing chains, wherein each of the M signal processing chains is coupled to one of the M physical antenna elements;

wherein the array processing module is configured to generate N signal response values for the antenna array as a function of the M replicas of the received signal; wherein the N signal response values include at least one virtual antenna response value, wherein N is greater than M, and

wherein the array-processing module comprises:

an interpolation module coupled to the M signal processing chains, wherein the interpolation module is configured to generate the N signal response values for the antenna array as a function of the M replicas of the signal; and

a weighting module coupled to the M signal processing chains wherein the weighting module is configured to calculate N weighting parameters as a function of the N signal response values.

40. (New)   An antenna system for receiving a signal comprising:

an antenna array including M physical antenna elements, wherein the M physical antenna elements are spatially arranged to receive one of a

corresponding M replicas of the signal so as to be capable of generating M replicas of the received signal; and

an array processing module including M signal processing chains, wherein each of the M signal processing chains is coupled to one of the M physical antenna elements;

wherein the array processing module is configured to generate N signal response values for the antenna array as a function of the M replicas of the received signal; wherein the N signal response values include at least one virtual antenna response value, wherein N is greater than M, wherein the N signal response values for the antenna array include M signal response values corresponding to the M physical antenna elements, wherein the virtual antenna response value corresponds to a virtual antenna element positioned within a distance of $\lambda/2$ of at least two of the physical antenna elements, wherein λ represents a wavelength of a carrier frequency of the signal, and wherein the virtual antenna element is located at an edge of the antenna array.

41. (New)   An antenna system for receiving a signal comprising:

an antenna array including M physical antenna elements, wherein the M physical antenna elements are spatially arranged to receive one of a corresponding M replicas of the signal so as to be capable of generating M replicas of the received signal; and

an array processing module including M signal processing chains, wherein each of the M signal processing chains is coupled to one of the M physical antenna elements;

wherein the array processing module is configured to generate N signal response values for the antenna array as a function of the M replicas of the received signal; wherein the N signal response values include at least one virtual antenna response value, wherein N is greater than M, and wherein the array processing module is configured to generate N signal response values for the antenna array as a function of the M replicas of the received signal by methodologies selected from the group consisting of interpolation and extrapolation.

42. (New)   A receiver system for receiving a signal comprising:

an antenna array including M physical antenna elements for receiving M replicas of the signal, each of the M replicas being received by a corresponding one of the M physical antenna elements;

means for determining a response of each of the M physical antenna elements to the signal;

and

means for generating, as a function of the responses of the M physical antenna elements to the signal, N responses to the signal, respectively associated

with N spatial locations along the antenna array, wherein at least one of the N spatial locations is not coincident with a location of any of the M physical antenna elements and is placed at a non-equidistant location between two successive physical antenna elements, and wherein (N – M) responses of the N responses are associated with virtual antenna elements located among the physical antenna elements.

43. (New)   The receiver system of claim 42 wherein the means for generating includes means for generating at least one of the (N – M) responses by interpolating at least two of the M responses.

44. (New)   The receiver system of claim 42 wherein the means for generating includes means for generating at least one of the (N – M) responses by extrapolating from at least two of the M responses.